

DOCUMENT RESUME

ED 264 517

CS 008 100

AUTHOR Maria, Katherine
TITLE New Perspectives on Diagnostic Research.
PUB DATE 1 Apr 85
NOTE 27p.; Paper presented at the Annual Meeting of the American Educational Research Association (69th, Chicago, IL, March 31-April 4, 1985).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)
EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Cognitive Processes; Elementary Education; *Learning Disabilities; *Learning Processes; Learning Strategies; Prior Learning; *Reader Text Relationship; *Reading Comprehension; Reading Diagnosis; *Reading Difficulties; *Reading Research; Reading Strategies; Research Methodology
IDENTIFIERS Diagnostic Research

ABSTRACT

Predicated on the assumption that many of the problems exhibited by learning disabled children arise from difficulties they have in processing information, the program of research described in this paper was undertaken to (1) identify reading comprehension difficulties that are due to disorders in the reader, and (2) design and test effective instruction for remediating those disorders. The paper describes in detail the methodology of three studies, along with the instruments developed to identify children for each study. After a discussion of methodological problems encountered in the research, the paper concludes that the work supports previous findings indicating the interactionist nature of reading and reading disability, specifically that text structure interacts with prior learning in both good and poor readers to affect comprehension. (FL)

* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)

X This document has been reproduced as
received from the person or organization
originating it.
Minor changes have been made to improve
reproduction quality.

• Points of view or opinions stated in this docu-
ment do not necessarily represent official NIE
position or policy.

ED264517

New Perspectives on Diagnostic Research
Paper Presented as part of the Symposium
• Research on Reading Disabilities: Theoretical and
Methodological Issues
Conference of the
American Educational Research Association
Chicago, IL April 1, 1985

Katherine Maria
College of New Rochelle
New Rochelle, N.Y.

"PERMISSION TO REPRODUCE THIS
MATERIAL HAS BEEN GRANTED BY

Katherine Maria

BEST COPY AVAILABLE

TO THE EDUCATIONAL RESOURCES
INFORMATION CENTER (ERIC)."

CS008100

This paper will describe a program of research that arose from a model of reading disability somewhat similar to that proposed in the Wixon and Lipson paper. It will trace the progress of the research demonstrating how the data collected led the investigators to an increasingly interactionist perspective with regard to reading and reading disability. The research described is the work of Section I of the Reading Comprehension Task Force, a component of the Research Institute for the Study of Learning Disabilities at Teachers College, Columbia University. This institute carried out research under a federally funded grant from 1977-1983. Section I of the Reading Comprehension Task Force was under the direction of Dr. Walter MacGinitie. The research described in this paper was carried out by Dr. MacGinitie, Dr. Susan Kimmel and Dr. Katherine Maria.

The research program of the entire institute was predicated on the assumption that many of the problems exhibited by learning disabled children arose from difficulties they manifested in processing information. The reading comprehension task force had a mandate to identify reading comprehension difficulties that were due to disorders in the reader and to design and test effective instruction for

remediating these disorders.

Of necessity, therefore, the program of research began with a focus on the reader. Although Weaver (1978) had suggested that learning disabled children might have comprehension deficits that were masked by more prominent problems of word recognition, at the time this research program began, other learning disabilities research had been assuming that disabled readers were poor decoders. Variation in the disabled reader population had been recognized, however, since researchers in the field were engaged in a search for subgroups based on deficiencies in different basic processes (Johnson & Myklebust, 1967) or neurological differences (Mattis, French & Rapin, 1975).

The investigators in the project described here, however, began the program of research with an assumption that disabled readers were not necessarily just poor decoders and an awareness of the complex nature of the reading process that was based on the interactive models of Rumelhart (1977) and Kintsch (1979). These models suggested that possible differences in basic processing are limitless and that problems in comprehension might be due not only to a deficiency in one of the processes but also to a deficiency in the programming of the processing. This

programming involves the use of particular strategies so that a reader's difficulty might stem from the use of a strategy inappropriate for the particular reading task that he was asked to do.

Thus it appeared that a more useful way of categorizing disabled readers would be according to their use of inappropriate strategies. Spiro (1979) had already done this to some extent. He had suggested that poor readers could be categorized as consistently over-relying on either top-down or bottom-up processes. However, informal work done by Kimmel and MacGinitie (1981) and Maria and MacGinitie (1980) with middle grade children who had difficulty understanding what they read suggested several sub-categories within Spiro's category of top-down readers.

The first sub-category studied by the task force consisted of readers who tended to formulate at the outset an hypothesis about the meaning of the the text, then hold on to that interpretation rigidly in spite of disconfirming information in the later text. The main purposes of the task force's first formal study (Kimmel & MacGinitie, 1984) were to show that there is a group of children with a reading comprehension disability who can be characterized as

perseverative in their reading comprehension strategy and to explore the effects of this strategy on the comprehension and recall of texts. Since logic and informal work with children suggested that inductive texts (texts in which the main idea is stated at the end or not directly stated) would be difficult for these children, a screening test was developed to identify children who had much greater difficulty with inductive texts than with deductive texts (texts in which the main idea was stated or implied at the beginning).

The screening instrument contained 48 expository paragraphs, three to four sentences in length, drawn from published children's reading texts of approximately fourth grade reading level. There were 24 inductive paragraphs in three categories and 24 deductive paragraphs in four categories. These categories are fully described in the Kimmel and MacGinitie (1984) report. Children read the texts silently in class groups. They were directed to answer the multiple choice main idea question after each paragraph without looking back at the paragraph.

The screening test was given to 255 fifth and sixth grade children in a suburban public school. Sixteen children who had large differences between

5

their inductive and deductive regressed standard scores were selected as those who might possibly use a perseverative text processing strategy. Hereafter, they will be labeled the perseverative group. The Kuder-Richardson Formula 20 reliabilities of the inductive and deductive subtests and the intercorrelation of the two subtests were taken into account in selecting these children. Following the method of Thorndike (1973), only those children who had a difference of at least 1.2 SDs between their inductive and deductive scores were selected, so that there was a better than 50:50 chance that the difference was real and not due to chance.

Four individual tasks (described in the Kimmel and MacGinitie (1984) report) given to the children in the perseverative group were also given to 16 children whose overall scores on the screening test were matched with the scores of children in the perseverative group. However, the inductive and deductive scores of these comparison group children were very similar.

The four individual tasks compared the comprehension of the two groups of children when they read or listened to texts in which the topic was stated or implied near the beginning of the text and

when they read or listened to texts in which the topic was stated or implied near the end. Comprehension was measured with multiple choice questions and recalls, and reading rate was also analyzed. Using all these measures, the perseverative group consistently had relatively greater difficulty with texts in which the main idea came later in the text.

These results suggested that the screening test had identified a group of children who were disabled in reading comprehension when reading certain types of texts due to their consistent use of a perseverative text processing strategy. Observation of the behavior of these children as they listened to inductive type texts and analysis of recalls of inductive texts that they read suggested that they needed to be taught to evaluate their hypotheses and to pay more attention to key words that are cues to the structure of the different types of inductive texts.

Though the children in the perseverative group were alike in their use of a particular inappropriate strategy, there was variation within the group. For example, some of the children seemed impulsive in their selection of an hypothesis while other did not seem at all impulsive in the selection but subsequently stuck to their original hypothesis

despite disconfirming evidence.

Of course in this study there was variation in the types of inductive texts used as well as in the perseverative readers. One category of inductive texts which we labeled refutation texts were paragraphs in which a belief or idea was stated at the beginning of the paragraph and was later said to be false. The text below is one of the refutation texts used in the Kimmel and MacGinitie (1984) study.

Perhaps you have heard someone say that people live on Mars, that the planet is inhabited. You may have heard someone talk about men from Mars who were supposed to have come to Earth in spaceships called flying saucers. People have had such imaginative notions about traveling Martians off and on for centuries. As far as we know, there has never been any evidence to support such beliefs.

(O'Donnell & Cooper, 1973, p.43)

The refutation texts were particularly intriguing for two reasons. The first reason was related to the texts and the interaction of the information that they presented with the prior knowledge of the reader. These texts assumed incorrect prior knowledge on the

part of the reader. This assumption might be true or it might not, and it seemed that whether it was true or not might be an important factor affecting the comprehension of these refutation texts. For example, if a child believed in Martians, the refutation text given as an example would probably be more difficult for him or her than if he or she did not have this misconception. Was it the structure of the texts, the condition of the child's prior knowledge or both that was affecting the comprehension of these refutation texts?

Another reason for our interest in the refutation texts had to do with a second study that we had been conducting at the same time as the first study. Our informal work with other middle grade children had suggested another sub-category within the group of those who over-rely on top-down processes, i.e., children who overrelied on their prior knowledge about the topic of the text. These children seemed to use a few words in the text to call up related background knowledge, but they were not much constrained by the information in the text. They read as if the text was simply saying whatever it was that they already knew. These children appeared to be assimilating the text to their schema for the topic but failing to change or

accommodate their schema for the topic in light of the information in the texts. Because of this they will be referred to as the non-accomodating group. Pearson and Spiro (1981) had also suggested the existence of such a group and had recommended instructional procedures appropriate for them. A number of teachers who read the account of our informal work (Maria & MacBinitie, 1982) or who attended workshops in which we talked about our work with these children supported the fact that children often appear to use such a strategy with anecdotes from their own experience. Since our first study was progressing successfully, we set out to identify a non-accomodating group using a design similar to that used in the first study.

We hypothesized that like the perseverative group the non-accomodating group would be disabled only when reading certain texts, in this case, texts containing information that contradicted the reader's prior knowledge. We constructed a screening test with 28 expository texts. Although these texts were constructed rather than taken directly from children's reading material, an over-riding concern in their construction was their naturalness. Each text was about 150 words long and was constructed around two pieces of information. One piece of information was

judged to be consistent with middle grade children's prior knowledge schemata while the other was judged to be inconsistent. Each text was followed by two multiple choice questions, one testing the consistent information and one testing the inconsistent information. Each multiple choice question contained an inconsistent choice, a consistent choice and a distractor.

The inconsistent items were a problem since we realized that our judgement regarding the information was not a sufficient basis for labeling it consistent or inconsistent. We presented the questions without the texts to children similar to the subjects we planned to screen. Only those questions answered incorrectly by at least 70% of the children were retained as inconsistent questions. This necessitated eliminating 10 texts so that we now had a test with 18 consistent and 18 inconsistent items. The consistent items were another problem. They could not just be something the child already knew because then, of course, the inconsistent items would be harder than the consistent items for everybody. They had to test new information that was consistent with the child's prior knowledge. With these items, our judgement could not be checked in the same way as with the

//

inconsistent items.

The revised screening test was given to over 100 children, but the reliabilities of the two subtests proved to be insufficient. Items were eliminated and some items were added in order to improve the reliabilities so that there were now 20 items of each type in the screening test. The revised test was administered to 164 fifth and sixth grade children. This time the intercorrelation of the two subtests was too high so that the reliability of the difference scores was virtually non-existent. We went ahead and selected a group of 13 children who had sufficiently large differences between their regressed consistent and inconsistent scores so that using the same method as in the first study it appeared that the chances of a real difference were 1:1. In other words, half of the children could be expected to have real differences between their inconsistent and consistent scores. When this group and a matched group were compared on their ability to comprehend consistent and inconsistent information in an individual task, there was no difference between the groups. The group designated as non-accomodating was not using this strategy consistently.

Finally, we had to acknowledge defeat. We were

not able to identify a non-accomodating group in the same way that we identified a perseverative group. The methodological problems involved in working with the prior knowledge factor were much more difficult than working with structural factors of the texts as in the Kimmel and MacGinitie (1984) study. Of course, this does not mean that a non-accomodating group does not exist. In a more recent study involving intensive individual work with a small group of children who had much better vocabulary scores than comprehension scores, MacGinitie and MacGinitie (in press) did identify several middle grade children who did use this strategy consistently.

However, we had learned several things from our failure. We had gained an appreciation of the wide variation in children's prior knowledge. Even children who seemed alike in practically every way had great differences in their knowledge about common misconceptions. Therefore, any further work would require an individual rather than a general measure of prior knowledge.

It appeared to us that all the children were having some difficulty with texts that presented information that contradicted their prior knowledge. But it also appeared that the structure of the texts

was related to the level of difficulty.

So we began another study. One purpose of the study was to investigate whether middle grade children who were good and poor comprehenders would find refutation texts like those used in the Kimmel and MacGinitie (1984) study harder when they had the misconception referred to by the author than when they did not have the misconception.

A second purpose was to investigate whether alternate ways of structuring the text would affect the comprehension of the new information by good and poor comprehenders when they had the misconception corrected by the new information. The refutation texts used in the Kimmel and MacGinitie (1984) study hereafter referred to as R1 texts were the most common type of refutation text. These R1 texts are a particular type of contrast structure in which the author begins by referring to the misconception and then refutes the misconception by giving new information about the topic. One alternative way of structuring the text was to retain the contrast structure with its direct reference to the reader's misconception but to reverse the order of the two parts of the contrast. Texts written with this structure (R2 texts) thus began with the new

information and then contrasted this new information with the misconception held by the reader. Another way of structuring the texts (R3 texts) was to eliminate the contrast structure, to make no direct reference to the misconception and simply present the new information. R3 texts were quite common in middle grade reading material while R2 texts were not. The first text below is an example of an R2 text. The misconception assumed by this text is that lions live in the deep forest or jungle. The second text below is an example of an R3 text. This text assumes the same misconception.

R2_Text

Most lions live on grassy plains where their tawny coats blend into the background. However, the lion is often called the "King of the Jungle". Many stories have been written in which the lion is one of the main characters. Pictures that accompany these stories may show the lion hiding among the trees and stalking his prey in the deep forest.

R3_Text

The lion is often called "King of Beasts". Many stories have been written

in which the lion is one of the main characters. Pictures that accompany these stories should show the lion hiding and stalking his prey in the tall grass. Most lions live on grassy plains where their tawny coats blend into the background.

A third purpose was to investigate good and poor comprehenders' use of the linguistic cues to the contrast structure of R1 and R2 texts. As noted previously, the Kimmel and MacGinitie (1984) study had suggested that this was a factor in the comprehension all types of inductive texts. The linguistic cues in the R1 and R2 texts were adversative conjunctions and another type of cue that we labeled MS (Misconception Signal) words. MS words (or phrases) seem to signal that the information that constitutes the misconception is likely to be inaccurate. In the passage about lions, the MS words are often called and many stories have been written, while the adversative conjunction is however.

In order to determine whether individual subjects held the misconception refuted by a particular refutation text, a prior knowledge questionnaire consisting of 100 Yes-No questions with a confidence rating was administered to the fifth and sixth grades of a suburban parochial school by their classroom

teachers a month prior to subsequent individual testing of 25 poor comprehenders and 19 good comprehenders. The question below is a sample item from the prior knowledge questionnaire.

Is citric acid harmful to people? Yes No
Sure Fairly Sure Not Sure

Results of the prior knowledge questionnaire confirmed the wide variation in the children's knowledge about these topics. This wide variation made it impossible to follow the original plan, which was to find 18 items about which the selected subjects would have a misconception and 6 about which they all agreed and were correct, and to use these items as the basis for the construction of texts. The variation found necessitated giving some children different texts from others.

Children were selected as good and poor comprehenders based on their scores on the revised screening test described above and teacher nomination. Each selected subject orally read 24 texts of four types: 6 R1 (HM-texts about which they had a misconception), 6 R1 (NHM-texts about which they did not have a misconception), 6 R2 and 6 R3. Following the reading of each text, the subject was asked for an oral recall and was then asked the

related Yes-No question that had been on the prior knowledge questionnaire. The subject was asked to justify his yes or no answer by answering the question, "What did the story say about that?".

Three measures of comprehension were used for each text type. The first, designated the NEW score, was the total of the instances in which the new information in the text was present and correctly stated in the subject's recall. The second was the proportion of Yes questions (questions requiring a Yes answer) answered correctly, and the third was the proportion of No questions (questions requiring a No answer) answered correctly. Using these three measures of comprehension, good and poor comprehenders did not find R1 texts harder when they had the misconception than when they did not. However, the recalls of poor comprehenders often seemed to demonstrate interference from their misconceptions. Child A below had the misconception that ostriches bury their heads in the sand.

R1(HM) Text

The most popular belief about ostriches is that they bury their heads in the sand in the hope that their enemies will not notice them. Ostriches may well listen

intently for sound with their heads near the ground. They may even lower their heads to rest their neck muscles. But if they buried their heads in the sand, they would not be able to breathe.

Recall (Child A)

Ostriches bury their heads in the sand to hope that their enemies will not see them, and they sometimes bury their heads in the sand so they can hear what's coming close to them. And if they bury their heads down there, sometimes they cannot breathe and they, sometimes, they, ostriches bury their heads under the sand so they can rest their head muscles.

Question: Do ostriches bury their heads in the sand?

Response Child A: Yes

Question: What did the story say about that?

Response Child A: They bury their heads in the sand to rest either their head muscles or to keep, they hide from their enemies.

Using NEW scores on No questions as measures of comprehension, refutation texts without a contrast structure (R3) were harder than those that made direct

reference to the reader's misconception using a contrast structure (R1 and R2). Differences among the text types were not significant for the Yes questions.

One possible explanation for the finding that answers to Yes questions did not differ across the four text types is that the Yes questions only required the child to verify the new information presented in the story. No questions, on the other hand, required the children specifically to deny their misconceptions because of information found in the text. No questions were particularly hard to answer with R3 texts. One possible interpretation of this finding is related to the fact that R3 texts did not make direct reference to the misconceptions of the children as the R1 (HM) and R2 texts did. Thus, for the R3 texts, the only reference to the misconception was contained in the No questions.

If the fact that the No questions were harder when they accompanied the R3 texts is attributed to the fact that they called up the reader's misconception, then it can be seen that the question may interact with the reader's prior knowledge as well as with the text to affect comprehension. Indeed, in responding to R3 No questions, some good comprehenders, as well as some poor comprehenders, made attempts to reconcile

their incorrect responses with their recalls and with their misconceptions. For example, in recalling the text below, Child B included in his recall the new information that bristlecone pines were the oldest living trees. However, he answered incorrectly that California redwoods were the oldest living trees, justifying his answer by saying that bristlecone pine trees might be another name for California redwoods.

R3 Text

Scientists count the rings in a section of a tree trunk to find out how old a tree is. The greater the number of rings, the older the tree is. When scientists counted the rings in the bristlecone pines growing in California, they found the bristlecone pines had more rings than any other trees in the world.

Recall Child B:

Scientists cut down a tree at a certain point to find out how old it is. There are rings in the tree trunk, and the greater the number of rings the older the tree is. In California, the bristlecone pines---when the scientists cut them down, they discovered that those trees were the

oldest trees in the world.

Question: Are California redwoods the oldest living trees?

Response Child B: Yes. They said that when the scientists cut down the bristlecone pines, they were the oldest---they had more rings than any other tree in the world. (Repeat question) Well, maybe, because they don't say if the bristlecone pines are the same thing as the California redwoods.

R1 and R2 texts did not differ. However, good comprehenders tended to transform R2 texts into a more natural R1 structure in their recalls.

For both groups, inclusion of a statement of the misconception in the recall was related to inclusion of the new information even with length of recall controlled. Since the presence of a statement of the misconception in the recall meant that a child had included either an MS word, and adversative or a denial of the misconception in his or her recall, this finding does suggest a relationship between use of linguistic cue words and comprehension of refutation texts with a contrast structure. The finding that

good comprehenders included more MS words and adversatives in their recalls than poor comprehenders while total words did not differ significantly provides further support for this relationship.

As was mentioned at the outset of this paper, our research program led us to an increasingly interactionist perspective on reading and reading disability. The results of this third study supported our belief that text structure interacts with prior knowledge of good and poor readers to affect comprehension. The results added a further complication in suggesting that the nature of the question also affects comprehension by interacting with these other factors. A subsequent study using multiple choice questions obtained different results from the study just described adding to the complications. A study I am undertaking at the present time will seek to determine the reason for the differing results. As mentioned before, Dr. MacGinitie is continuing the focus on the reader. In a paper currently being submitted for publication, he has identified various other inappropriate text processing strategies used by children identified as poor comprehenders.

In summary, our data has led us to an increased

awareness of the complexity of interactions involving factors in both the reader and the text that contribute to the comprehension of text. The methodological problems especially with regard to the prior knowledge factor are quite difficult. But we believe the questions and our focus are important so we are continuing to struggle with the problems.

REFERENCES

- Johnson, D. & Myklebust, H. (1967). Learning disabilities: Educational principles and practices. New York: Grune & Stratton.
- Kimmel, S. & MacGinitie, W. (1981). Children with a perseverative text interpretation strategy: The effect of text organization (Technical Report No. 13). New York: Research Institute for the Study of Learning Disabilities, Teachers College, Columbia University.
- Kimmel, S. & MacGinitie, W. (1984). Identifying children who use a perseverative text processing strategy. Reading Research Quarterly, 19, 162-172.
- Kintsch, W. (1979). On modeling comprehension. Educational Psychologist, 14, 3-14.
- MacGinitie, W. & MacGinitie, R. (1984) The diagnostic value of vocabulary-comprehension discrepancies. Unpublished manuscript.
- Maria, K. & MacGinitie, W. (1980, July) Prior knowledge as a handicapping condition. Paper presented at the Fourth International Colloquium in School Psychology, Jerusalem.
- Maria, K. & MacGinitie, W. (1982). Reading comprehension disabilities: Knowledge structures and non-accomodating test processing strategies. Annals of Dyslexia, 32, 33-59.
- Maria, K. & MacGinitie, W. (1983) The effect of refutation structure texts on the reading comprehension of middle grade good and poor comprehenders (Technical Report No. 20). New York: Research Institute for the Study of Learning Disabilities, Teachers College, Columbia University.
- Mattis, S. French, J.H., & Rapin, I. (1975). Dyslexia in children and young adults: Three independent neuropsychological syndromes. Developmental Medicine and Child Neurology, 17, 150-163.

- O'Donnell, M. & Cooper, J.L. (1973). From pyramids to princes (Level 14). New York: Harper & Row.
- Rumelhart, D.E. (1976). Toward an interactive model of reading. In S. Dornic (Ed.). Attention and performance VI (pp. 573-603) London: Academic Press.
- Spiro, R.J. (1979). Etiology of reading comprehension style (Technical Report No. 124). Urbana: University of Illinois, Center for the Study of Reading. (ERIC Document Reproduction Service No. ED 170 734).
- Thorndike, R.L. (1973) Dilemmas in diagnosis. In W.H. MacGinitie (Ed.), Assessment problems in reading. Newark, DE: International Reading Association.
- Weaver, P. (1978). Comprehension, recall and dyslexia: A proposal for the application of schema theory. Bulletin of the Orton Society, 29, 157-171.